

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with **Attorney Jeremy D. Tilman** (reg. # 62,639, tel. 703-836-6400) on **April 27, 2010** to cancel non-elected Claims 1 and 5-9 as following:

#### **Claim**

**Claims 1 and 5-9** please cancel Claims 1 and 5-9

### **DETAILED ACTION**

2. This Office Action is in response to **Amendment** filed on March 1, 2010, which is in response to Non-Final office action of September 30, 2009. With such an amendment, **Claims 1-6 and 8 are amended; non-elected Claims 1 and 5-9 (Groups I and IV-V) are cancelled, while no new claim is added.** To be specific, parent **Claim 2** is now “once-amended” in **one**

way to amend the improper language “compound”, while its dependent **Claim 3** is amended to correct the wrong chemical structure of Formula (2) so as to overcome claim objections.

The use of above-mentioned Examiner's Amendment is only to cancel non-elected Claims 1 and 5-9 (Groups I, IV and V). After further consideration, **non-elected Claim 4 (Group III) relates to the process of making a graft copolymer and it is now rejoined by Examiner to be with elected Group II (Claims 2 and 3).**

Applicants have filed only **one IDS** (1 page) so far. Examiner **accepts Applicants' one drawing sheet with Figure 1** (a brief description is shown on page 7). **Claims 2, 3 and 4 with two independent claims (Claim 2 and Claim 4) are now pending.** An action follows. See **no** “X” or “Y”-cited reference in international search report in Applicants' priority document **PCT/JP2004/017988.**

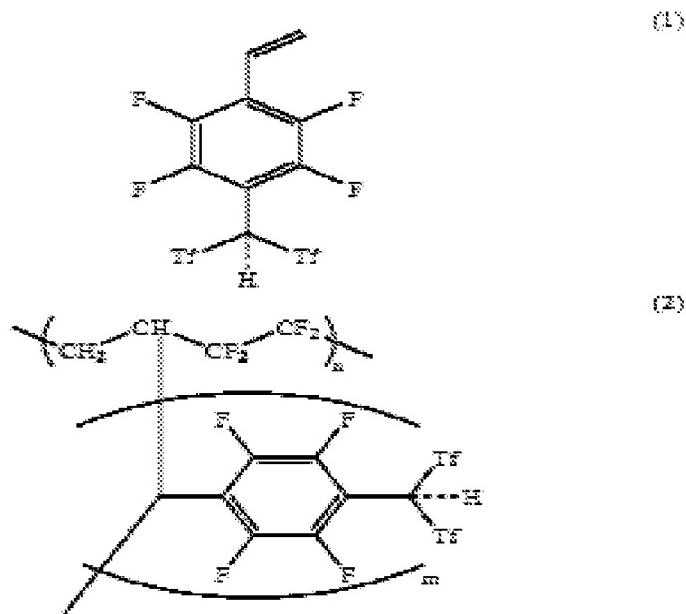
3. Claim rejections under **Non-Final** Office Action filed on September 30, 2009 are now removed for the reasons given in paragraphs 4-11 thereafter.

*Allowable Subject Matter*

4. Claims 2, 3 and 4 are allowed.

5. The following is an examiner's statement of reasons for allowance: The above Claims 2, 3 and 4 are allowed over the closest references:

6. The limitation of “**once-amended**” parent **Claim 2** in present invention relates to a graft copolymer having a general formula (2). Said polymer has a grafting monomer having a formula (1) with two Tf or trifluoromethane sulfonyl groups (-SO<sub>2</sub>-CF<sub>3</sub>).



Newly rejoined independent **Claim 4** relates to a process of making a graft copolymer of independent **Claim 2**.

*See other limitation of dependent **Claim 3**.*

7. Regarding the “**grafting copolymer**” of “**once-amended**” parent **Claim 2**, the graft copolymer is achieved by directly applying a “styrene” type monomer having formula (1) for radiation-induced graft polymerization onto the backbone of some base polymer(s). According

to its dependent **Claim 3**, said base polymer includes copolymer made of the claimed two monomers including ethylene (E) and tetrafluoroethylene (TFE) as disclosed in dependent **Claim 3** in this regard. In summary, said “styrene” type grafting monomer has a combination of three conditions including: (A) a para-styrene to be useful as polymerizable moiety, (B) four fluorine on benzene ring, and (C) a specified methyl group having two Tf (trifluoromethane sulfonyl) groups on the *para* position. Newly rejoined independent **Claim 4** relates to a process of making a graft copolymer of independent **Claim 2**.

8. **103(a) rejections** relying on two primary references including **MacKinnon and Stone** in view of three secondary references including **Ishihara, Middleton and Sprague** even in combination still cannot stand as follows: As discussed earlier, **MacKinnon and Stone** only discloses some graft polymerization process by irradiating at a base polymer with ionizing radiation, while the base polymer can be a copolymer or a dipolymer made of the claimed two monomers including **ethylene (E) and tetrafluoroethylene (TFE)**. Some monomers are used for graft polymerization. However, the claimed “styrene” type monomer having formula (1) is not disclosed at all.

9. As exactly pointed out by Applicants in pages **12-14** of Remarks, the combination of three secondary references including **Ishihara, Middleton and Sprague** is not motivated enough to achieve the claimed “styrene” type monomer having formula (1). Even **Middleton and/or Sprague** suggests the vinyl-containing styrenic monomer can be still polymerizable

when it is attached with some fluorinated substituent(s), **Ishihara**'s pentafluorophenylbis(triflyl)-methane is merely a precursor and it is still far away from chemical modification so to become a polymerizable monomer.

10. As well known in the art, it will still take great efforts in chemical modification to achieve the desired chemical structure even in the case the difference is only a tiny one. Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the product by chemical structure limitation of present invention.

11. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

**US 6,607,856 B2 to Suzuki et al.** only discloses the preparation of some IPN structure containing some functional groups of sulfonic acid or phosphoric acid. See abstract and Figure # 9. The claimed "styrene" type monomer having formula **(1)** for radiation-induced graft polymerization onto some base polymer(s) is not disclosed or suggested at all. Therefore, Suzuki cannot teach or suggest the limitation of parent Claims 2 and 4.

**US 2007/0292734 A1 to Kiefer et al.** only discloses a process for producing a proton conducting electrolyte membrane for fuel cell application. It is only achieved by **irradiating a polymer film and then "graft"-polymerized a vinylphosphonic acid monomer**. See abstract,

line 1-5; Claim 1 at page 16. The claimed “styrene” type monomer having formula **(1)** for radiation-induced graft polymerization onto some base polymer(s) is not disclosed or suggested at all. Therefore, Kiefer cannot teach or suggest the limitation of parent Claims 2 and 4.

12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the two independent claims including **Claim 2 (product) and Claim 4 (process of making)** is allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending dependent **Claim 3** is passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu whose telephone number is (571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Dr. Vasu Jagannathan, can be reached on (571) 272-1119. The **fax** number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peter D. Mulcahy/  
Primary Examiner, Art Unit 1796

/Henry S. Hu/  
Examiner, Art Unit 1796

June 5, 2010